IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MARYLAND

                               :

VISUAL NETWORKS OPERATIONS,
INC.   :

    v.   : Civil Action No. DKC 2004-0604

                               :

PARADYNE CORPORATION
                               :

MEMORANDUM OPINION

At issue in this patent infringement case are the constructions of certain claims within patents held by Plaintiff Visual Networks Operations, Inc. ("VNO") and Defendant Paradyne Corporation ("Paradyne"). A hearing was held on February 7, 2005, and the parties have submitted proposed conclusions of law as to the construction of the disputed terms. After consideration of the parties' positions as argued at the hearing and presented in their papers, the court finds as follows.

I.   General Background

VNO is a self-described provider of performance management solutions that monitor and verify performance and reliability of communications networks and services. Paradyne is a developer, manufacturer and distributor of broadband network access products. The two companies compete directly in the product market for network performance monitoring.

VNO contends that Paradyne infringed on United States Patents Nos. 5,867,483 (issued Feb. 2, 1999) ("the 483 patent"), 6,147,998 (issued Nov. 14, 2000) ("the 998 patent"), and 6,058,102 (issued May 2, 2000) ("the 102 patent"). Paradyne contends that VNO infringed on United States Patents Nos. 5,898,674 (issued Apr. 27, 1999) ("the 674 patent"), 6,269,082 (issued July 31, 2001) ("the 082 patent"), 6,038,219 (issued Mar. 14, 2000) ("the 219 patent"), and 6,493,352 (issued Dec. 10, 2002) ("the 352 patent").[1] All told, the parties dispute the meanings of 37 terms and phrases.

II. Technology Background

The patents in dispute describe technologies that help network service providers monitor the performance of wide area networks ("WANs").

WANs are often described as "switching" networks, in that they consist of transmission lines, or "access channels," and switches. An access channel carries data between two points; typical access channels include wires and optic fibers. A switch is a node at which data is transferred from one access channel to another so it can proceed toward its destination.

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[1] Paradyne also asserted infringements on seven other patents in its counterclaim, but has since dropped those claims. *See* paper no. 77 (Stipulation of Partial Dismissal).

The amount of data that can travel through an access channel per unit of time is its "bandwidth."[2]

WANs are sometimes called "packetized" (or "packet-switching" or "packet") networks because data travels through the network in small, discrete units called "packets" or "cells." To send data across the network, the data is broken into as many packets as necessary, and the packets are then sent individually across the network and reassembled at their destination.[3] Each packet has two parts: a "header" and a data payload. The header contains information the network needs to deliver the packet to its destination. The payload is the actual data to be transmitted, or a portion thereof.[4]

There are different types of switching networks. The three with which these patents are concerned are "frame relay," "ATM,"

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[2] Bandwidth in communications is similar to pipe width in plumbing: The wider the pipe, the more water -- or data -- can flow through per unit of time.

[3] The postal system provides a good analogy: Imagine sending a ten-page letter by mailing each numbered page in a separate envelope. After receiving all ten envelopes, the recipient would reassemble the letter by arranging the pages in their proper page number order. While obviously inefficient in the world of postal mail, in electronic communications, this method yields important advantages, the details of which are unimportant here.

[4] Extending the postal analogy, a packet header is analogous to the information on the outside of an envelope (the address, postage, and so on), while the payload is the equivalent of the contents of that envelope.

and "hybrid" frame relay/ATM networks. The primary differences

between frame relay and ATM networks are that frame relay

networks utilize packets of varying sizes, up to 4000 bytes,

whereas ATM networks use cells of a uniform, small size of 53

bytes; and that ATM technology is newer and significantly faster

than frame relay. In a hybrid network, parts of the network use

frame relay technology while other parts use ATM technology.

To send data between two points, the provider of the

switching network (the "service provider") chooses a path

between the source and destination computers -- that is, a

series of transmission lines and switches -- and the packets

containing the data are transmitted from source to destination

along that path. This path is called the "virtual circuit." To

the user, the virtual circuit appears to be a dedicated, point-

to-point connection between source and destination; the user is

unconcerned with the exact path the data takes, just as someone

who mails a letter is unconcerned with which routes the postal

service uses to deliver it.   In fact, a virtual circuit is an

abstraction: Physical circuits can actually carry data

traveling between many different points simultaneously, but a

virtual circuit is a logical connection between just two points

in the network.   A virtual circuit can be set up for temporary

use (for example, a telephone connection between two people that

lasts only until the parties hang up) or as a permanent connection between two points.

Service providers typically offer customers service level agreements ("SLAs"), in which the service provider guarantees a particular, measurable quality of network service. One method for monitoring networks for quality of service is to implant "probes" in the network at various points. A probe is a device which intercepts, counts or analyzes, and then retransmits data traveling on the network in order to gather information about the flow of data through that point in the network.

III. Standard of Review

In another recent claim construction opinion, Judge Nickerson summarized the general principles at play:

> Claim construction is a question of law, to be determined by the Court. *See, Markman v. Westview Instruments, Inc.,* 52 F.3d 967, 976 (Fed.Cir. 1995) (en banc), *aff'd*. 517 U.S. 370, 134 L. Ed. 2d 577, 116 S. Ct. 1384 (1996). It is well established that in interpreting an asserted claim, a court should look first to the intrinsic evidence of record, i.e., the claims themselves, the specification, and the prosecution history. *See, Vitronics Corp. v. Conceptronic, Inc.,* 90 F.3d 1576, 1584 (Fed.Cir. 1996).
> The court must look first to the actual wording of the claims. *Id.* at 1584. The words of a patent claim are to be given their common and ordinary meaning. Unlike other legal writings, however, the meaning given to terms used in patent claims is the common and ordinary meaning to "one skilled in the art." *Schenck v. Nortron Corp.,* 713 F.2d 782, 787 (Fed.Cir. 1983). Although words in a claim are generally given their

ordinary and customary meaning, a patentee may choose to be his or her own lexicographer and use terms in a manner other than their ordinary meaning, provided that the definition of the term is clearly stated in the patent specification or the file history. *Vitronics,* 90 F.3d at 1582.

The second tier of intrinsic evidence guiding the construction of claims is the language of the patent specification. *See, Standard Oil Co. v. American Cyanamid Co.,* 774 F.2d 448, 452 (Fed.Cir. 1985). The specification functions as a dictionary to explain the claimed subject matter and define the terms used in the claims. *Minnesota Min. and Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.,* 976 F.2d 1559, 1566 (Fed.Cir. 1992). The specification is to be used only to interpret words or phrases of a patent claim, not to add to, or detract from, the language of the claims. *See, In re Paulsen,* 30 F.3d 1475, 1480 (Fed.Cir. 1994) (quoting *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.,* 849 F.2d 1430, 1433 (Fed.Cir. 1988), *cert. denied,* 488 U.S. 986, 102 L.Ed. 2d 572, 109 S.Ct. 542 (1988)).

Finally, the court should also examine the prosecution history of the patent, that is, the public record of the proceedings before the United States Patent Office. "The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." *Southwall Tech., Inc. v. Cardinal IG Co.,* 54 F.3d 1570, 1576 (Fed.Cir. 1995), *cert. denied,* 516 U.S. 987, 133 L.Ed. 2d 424, 116 S.Ct. 515 (1995).

C.M.L. s.r.l. v. Ineco Indus. Navarra de Equipos y Comercio, S.A., 177 F.Supp.2d 442 (D.Md. 2001).

Some issues of claim construction recur throughout the instant disputes and are worth noting at the outset. First, the parties disagree as to the extent to which the preambles of Paradyne's claims can or cannot limit the scope of those claims. Paradyne asserts that preamble language is inherently non-

limiting.   Another court in this district recently explained

otherwise:

> A patent's preamble is also a tool for the court
> in construing a patent's claims. The importance of
> the claim preamble in limiting claims is dictated by
> the words in the preamble itself. *Bell Comm.*
> *Research, Inc. v. Vitalink Comm. Corp.,* 55 F.3d 615,
> 620 ([Fed.Cir.] 1995). If the words suggest that the
> preamble is necessary to give life, meaning and
> vitality to the claims, then it should be read in that
> manner. *Id.* at 620-21. Further, "where a patentee
> uses the claim preamble to recite structural
> limitations of his claimed invention, the [USPTO] and
> courts give effect to that usage." *Rowe v. Dror,* 112
> F.3d 473, 478 (Fed.Cir. 1997).

Leviton Mfg. Co. v. Universal Sec. Instruments, Inc., 304

F.Supp.2d 726, 743 (D.Md. 2004). The Federal Circuit elaborated

in *Bell Comm. Research*:

> [T]he preamble has been denied the effect of a
> limitation where . . . the claim or [interference]
> count apart from the introductory clause completely
> defined the subject matter [of the invention], and the
> preamble merely stated a purpose or intended use of
> that subject matter. On the other hand, in those . .
> . cases where the preamble to the claim or count was
> expressly or by necessary implication given the effect
> of a limitation, the introductory phrase was deemed
> essential to point out the invention defined by the
> claim or count. In the latter class of cases, the
> preamble was considered necessary to give life,
> meaning and vitality to the claims or counts.

55 F.3d at 620-21 (quoting *Kropa v. Robie,* 187 F.2d 150, 152

(C.C.P.A. 1951)) (footnote omitted). The court therefore

analyzes each of Paradyne's preambles according to its own

terms.

Second, several of the parties' claim disputes hinge on whether a claim is or is not a "means-plus-function" claim. The relevant statute, 35 U.S.C. § 112, ¶ 6, provides:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

The Federal Circuit recently explained:

> Such limitations are generally known as "means-plus-function" or "step-plus-function" limitations. Through use of means-plus-function limitations, patent applicants are allowed to claim an element of a combination functionally, without reciting structures for performing those functions.
>
> It is well settled that "[a] claim limitation that actually uses the word 'means' invokes a rebuttable presumption that § 112, ¶ 6 applies. . . ."
>
> When a claim uses the term "means," the focus is on whether the claim term recites no function corresponding to the means or recites sufficient structure or material for performing that function.
>
> "To help determine whether a claim term recites sufficient structure, we examine whether it has an understood meaning in the art." As an aid in making this determination, this court inquires into whether the "term, as the name for the structure, has a reasonably well understood meaning in the art," keeping in mind that a claim term "need not call to mind a single well-defined structure" to fall within the ambit of § 112, ¶ 6.

Apex Inc. v. Raritan Computer, Inc., 325 F.3d 1364, 1371-72 (Fed.Cir. 2003) (citations omitted). In other words:

> A means-plus-function claim is one that refers to a "means" for performing a given function without specifying the structure for performing that function. 35 U.S.C. § 112, ¶ 6; *Chiuminatta Concrete Concepts v. Cardinal Indus.,* 145 F.3d 1303, 1307-08 (Fed.Cir. 1998). Use of the term "means" in a claim raises a presumption that § 112, ¶ 6 applies. *QSI Indus., Inc. v. Mike's Train House, Inc.,* 230 F.Supp.2d 1240, 1244 (D.Or. 2002) (citing *Kemco Sales, Inc. v. Control Papers Co., Inc.,* 208 F.3d 1352, 1361 (Fed.Cir. 2000)).
>
> The court employs a two-step process for construing means-plus-function claims. First, the court uses ordinary principles of claim construction to determine the function as explicitly set forth in the claims. *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.,* 296 F.3d 1106, 1113 (Fed.Cir. 2002) (internal citations omitted). Second, the court determines, from the perspective of one of ordinary skill in the art, what structure, if any, disclosed in the specification corresponds to the claimed function. *Id.* Any such specification must clearly associate the structure with the performance of the function. *Id.* Alternative embodiments may disclose different corresponding structures. *Id.* at 1113-114. *See also Serrano v. Telular Corp.,* 111 F.3d 1578, 1583 (Fed.Cir. 1997).

Leviton, 304 F.Supp.2d at 743. The question whether a claim is subject to § 112 ¶ 6 is, like other claim construction questions, one of law. *See Lighting World, Inc. v. Birchwood Lighting, Inc.,* 382 F.3d 1354, 1358 (Fed.Cir. 2004).

Third, in its opposition brief, VNO repeatedly faults Paradyne for using dictionaries in its analysis of the intrinsic record. Paper no. 62, at 3 (Paradyne analysis of the intrinsic record "wrongly includes . . . dictionaries"); *id.* at 13

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("Paradyne invites the Court to completely ignore the intrinsic

evidence and jump straight to extrinsic evidence"); *id.* at 20

(Paradyne has "completely ignore[d] the intrinsic record" by

"diving head-first into extrinsic dictionary definitions").

This blanket assessment is unjustified. It is true that

> although the dictionary can be an important tool in
> claim construction by providing a starting point for
> determining the ordinary meaning of a term to a person
> of skill in the art, "the intrinsic record" can
> resolve ambiguity in claim language or, where clear,
> trump an inconsistent dictionary definition.

Kumar v. Ovonic Battery Co., 351 F.3d 1364, 1367-68 (Fed.Cir.

2003). However, as a general matter,

> [d]ictionaries and technical treatises, which are
> extrinsic evidence, hold a "special place" and may
> sometimes be considered along with the intrinsic
> evidence when determining the ordinary meaning of
> claim terms. [*Interactive Gift Express, Inc. v.
> Compuserve Inc.,* 256 F.3d 1323, 2001 WL 792669, *6 n.1
> (Fed.Cir. 2001)]; *see also* [*Cybor Corp. v. FAS Techs.,
> Inc.,* 138 F.3d 1448, 1459 (Fed.Cir. 1998) (en banc)]
> (stating that, although technically extrinsic
> evidence, dictionaries may be consulted at any time to
> help determine the meaning of claim terms); *AFG Indus.
> v. Cardinal,* 239 F.3d 1239, 1248, 57 U.S.P.Q.2D (BNA)
> 1776, 1783 (Fed.Cir. 2001) (noting that non-scientific
> dictionaries are less preferable when defining
> technical words); *Oak Tech., Inc. v. Int'l Trade
> Comm'n,* 248 F.3d 1316, 1320-1326, 58 U.S.P.Q.2D (BNA)
> 1748, 1750-56 (Fed.Cir. 2001) (relying on technical
> treatise to determine the ordinary meaning of certain
> claim limitations).

Dow Chem. Co. v. Sumitomo Chem. Co., 257 F.3d 1364, 1372 (Fed.Cir. 2001).[5]

Fourth and finally, both sides attempt repeatedly to import into claims limitations from structures described in those claims' preferred embodiments. The court, however, heeds the Federal Circuit's consistent warnings against using this approach to restrict the meaning of a claim term. *See Arlington Indus., Inc. v. Bridgeport Fittings, Inc.*, 345 F.3d 1318, 1327 (Fed.Cir. 2003) ("the presumption of ordinary meaning cannot be rebutted 'simply by pointing to the preferred embodiment or other structures or steps disclosed in the specification or prosecution history'") (quoting *CCS Fitness, Inc. v. Brunswick Corp.,* 288 F.3d 1359, 1366 (Fed.Cir. 2002) and citing other cases).

IV. Analysis of VNO's Claims

A.   The 483 Patent

The 483 patent is a method and apparatus for measuring peak throughput in packetized data networks. Peak throughput is a measure of how much data, at a maximum, is traveling through the

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[5] The court notes that several fundamental questions regarding the use of dictionaries and specifications in claim construction are currently pending before the Federal Circuit, which has heard argument *en banc* but has not yet ruled. *See Phillips v. AWH Corp.,* 376 F.3d 1382 (Fed.Cir. 2004) (order for rehearing *en banc*).

network.   The 483 patent describes a way to measure peak throughput using probes. For the duration of some sampling interval, each probe measures how much data travels through the point where that probe is connected to the network, and remembers approximately what proportion of that part of the network's total available bandwidth was used: For example, in the preferred embodiment of the 483 patent, the probe remembers whether the proportion of bandwidth being used was less than 10%, between 11% and 40%, between 41% and 60%, between 61% and 90%, or greater than 90%. The probe remembers the range into which the measured proportion falls by incrementing one of several "counters:" e.g., if in one sample, the throughput is measured to be 45% of available bandwidth, the "41% to 60%" counter is incremented. After several sampling intervals, the counters together represent a useful approximation of how much of the network's bandwidth is being utilized.

The 483 patent describes a system that allows the user to choose to measure the throughput of an entire access channel or of one virtual circuit therein. The described system also analyzes the throughput data to make recommendations as to how to make more efficient use of the available bandwidth.

The parties dispute the meaning of the following terms and phrases in the 483 patent: "measuring utilization," "capacity

information," and "console means."[6]   These phrases appear in claims 1 and 16 of the 483 patent.

Claim 1 describes an apparatus for measuring peak utilization of a data transmission system, comprised in part of

> a probe connected to the data transmission system for *measuring utilization* of an access channel and individual transmission circuits associated with that channel, and generating *capacity information* relating to the utilization percentage of the data transfer capacity of said access channel and each of its transmission circuits during successive predetermined sampling intervals, said probe including:
>
> a plurality of counters for maintaining said *capacity information* in the form of count totals . . . ; and
>
> incrementing means . . . for incrementing each counter for each sampling interval . . . ; and

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[6] The parties initially disputed additional terms in this and the other patents, but, as indicated by the parties in their papers and at the *Markman* hearing, have since resolved those differences. The terms and phrases in these patents originally but no longer in dispute include: in the 483 patent, "individual transmission circuits" and "during successive predetermined sampling intervals;" in the 102 patent, "timestamp information" and "count field;" and in the 998 patent, "standard header," "specific payload," and "having a header identical to the data cells."

In the Joint Statement, the parties presented alternative (although highly similar) definitions for the 998 patent's phrase "having an unique payload."   At the hearing, VNO indicated that it would rely on its brief for argument regarding the phrase, but it does not appear anywhere in VNO's brief. Paradyne mentioned the phrase neither at hearing nor in its responsive brief.   The court therefore considers this dispute withdrawn as well.

> *console means* coupled to said probe for receiving said
> *capacity information* in the form of said count totals
> from said plurality of counters and processing said
> *capacity information* to selectively display data
> transfer capacity utilization for the access channel
> and individual circuits over a predetermined time
> interval.

483 patent at col. 39:10-19, 27-29, 34-39 (italics added).

Claim 16 describes the corresponding method for measuring

peak utilization. The first step of the method is

> *measuring utilization* of an access channel and
> individual transmission circuits associated with that
> channel, and generating *capacity information* in the
> form of count totals maintained by a plurality of
> counters and relating to the utilization percentage of
> the data transfer capacity of said access channel and
> each of its individual circuits during successive
> predetermined sampling intervals by assigning each
> said counter a range of utilization percentages . . .
> to indicate a count of said sampling intervals during
> which the utilization percentage . . . is in the range
> assigned to that counter, and incrementing each
> counter for each sampling interval . . . .

483 patent at col. 40:64-41:11 (italics added).

1.   *"measuring utilization"*

VNO states that "measuring utilization has its ordinary and

customary meaning, such as taking or making a measurement of the

use of something." Paradyne counters that the phrase means

"taking steps to ascertain a ratio representing the amount of

time a system or component is busy divided by the time it is

available." The court agrees with VNO. First, Paradyne's

alternative is clearly too narrow: By limiting the measurement

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to the single ratio of time busy over time available, it reflects only how often a channel is in use at all, and not the extent to which that channel is being utilized, a measurement clearly within the plain meaning of "utilization" in this context.

Second, the court notes that, in the context of claims 1 and 16, the phrase has sufficiently specific meaning: Utilization is measured by gathering capacity information through the use of counters as described in the balance of each claim. In patent disputes, "claim terms are not construed in a vacuum. Rather, to interpret claim terms we look to all of the intrinsic evidence as it pertains to the terms in question." *DeMarini Sports v. Worth, Inc.,* 239 F.3d 1314, 1327 (Fed.Cir. 2001).

2.   *"capacity information"*

VNO states that "capacity information has its ordinary and customary meaning, such as indication of the utilization percentage." Paradyne counters that the phrase means "data expressed to represent knowledge of the carrying ability of a telecommunications facility." The court is hard pressed to see how the two definitions differ in substance, especially because the next sentence of claim 1 explains exactly what and how capacity information is collected within the scope of this patent.   The court therefore finds that the ordinary and

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customary meaning of the phrase, as offered by VNO, is sufficiently descriptive.

3.   *"console means"*

As previously noted, use of the word "means" in the phrase "console means" invokes a rebuttable presumption that § 112, ¶ 6 applies.   The court must determine whether the claim term "recites no function corresponding to the means" or "recites sufficient structure or material for performing that function." *Apex,* 325 F.3d at 1372.   VNO contends that "console means" recites sufficient structure to perform the claimed function in its entirety, in that it "has its ordinary and customary meaning, such as an input device, an output device and a processor by which an operator can monitor a system."

Paradyne counters that "console means is a means plus function clause . . . that performs the functions of 'receiving . . . and processing . . . to selectively display.'"   Paradyne argues in the parties' Joint Claim Construction Statement, paper no. 44 (hereinafter "Joint Statement"), that the structure for performing these functions must be a "special purpose computer" programmed to receive, process and display information consistent with the preferred embodiment, because under VNO's definition, the phrase does not recite sufficient structure to perform the claimed function in its entirety.

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The court agrees with Paradyne that VNO's definition recites insufficient structure. The function of the "console means" is to receive capacity information from counters, in the form of count totals, and then process that information to "selectively display data transfer capacity utilization for the access channel and individual circuits . . . ." VNO states in its brief that § 112 ¶ 6 applies unless "the claim language specifies the specific physical structure that performs the function." Paper no. 52, at 19. VNO argues that the console is that physical structure. A general purpose computer, however, is not, itself, sufficient structure to defeat means-plus-function analysis. As another court explained,

> [C]omputers which can be programmed to carry out a myriad of functions, whereby the program itself changes the structure of the computer by affecting its electrical paths, create a special problem in means-plus-function claim construction. Since the disclosed structure cannot in these circumstances be identified as the general purpose computer, whose structure changes according to its programmed function, a court must identify the special purpose computer programmed to perform the disclosed algorithm.

Faroudja Lab., Inc. v. Dwin Elecs., Inc., 76 F.Supp.2d 999, 1010 (N.D.Cal. 1999) (citing *WMS Gaming, Inc. v. Int'l Game Tech.,* 184 F.3d 1339, 1348-49 (Fed.Cir. 1999)). Put simply, a "console coupled to [a] probe" does not describe sufficient structure to

perform the function because it does not explain how the console would receive, process and display the capacity information.

VNO alternatively argues that, if the phrase is construed under § 112 ¶ 6, the structure set forth in the specification is "a conventional computer, preferably including at least an input device, an output device and a processor." This level of detail is also insufficient to provide the necessary structure. While it is true that a general purpose computer might be used in the described scenario, simply coupling such a computer to a probe will not result in the receipt, processing and selective display of capacity information. More is required: The console must be programmed to do all three. VNO argues that the console "*may* also include software for analyzing the data collected by the probe and displaying the information to an operator," paper no. 52, at 20 (italics added), but in fact, it *must*; without programming, the console cannot perform the function described.

VNO cites three cases where courts found recitation of physical structure to constitute sufficient structure to avoid application of § 112 ¶ 6: *Envirco Corp. v. Clestra Cleanroom, Inc.,* 209 F.3d 1360 (Fed.Cir. 2000); *TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.,* 375 F.3d 1126 (Fed.Cir. 2004); and *Cole v. Kimberly-Clark Corp.,* 102 F.3d 524 (Fed.Cir. 1996). Each of these cases, however, differs critically from the

instant case in that, in each, *the structure of the "means" is described in the disputed claim*. The court's reasoning in those cases is instructive.   In *Envirco,* the court construed the meaning of the phrase "second baffle means" in the following claim:

> A compact air purification apparatus . . . comprising
> . . . second baffle means disposed radially outwardly
> of said centrifugal fan means and said first baffle
> means, said second baffle means having inner surfaces
> for directing the airflow from said centrifugal fan
> means inwardly of said primary housing and between
> said first baffle means and said filter means whereby
> air being introduced into said housing by said
> centrifugal fan means will be directed radially
> outwardly of said centrifugal fan means and guided by
> said first baffle means towards said second baffle
> means and thereafter by said second baffle means
> between said first baffle means and said air filter
> means.

209 F.3d at 1362-63. The Federal Circuit explained that this element was not subject to application of § 112 ¶ 6:

> Although using the word "means" to describe the
> second baffle, the '395 claims also recite sufficient
> structure to rebut the presumption that the term is in
> means-plus-function form. The term "baffle" itself is
> a structural term. The dictionary definition of the
> word "baffle" is "a device (as a plate, wall or
> screen) to deflect, check, or regulate flow."
> Webster's Ninth New Collegiate Dictionary 124 (1990).
> Because the term "baffle" itself imparts structure,
> meaning a surface which deflects air, its use in the
> claims rebuts the presumption that § 112, ¶ 6 applies.

> Further, the claims describe the particular
> structure of this particular baffle ("having inner
> surfaces for directing airflow . . . radially outward
> . . . and thereafter . . . between said first baffle

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> means and said air filter means").   This recital of
> structure conflicts with the statutory requirement
> that means-plus-function claim elements state a
> function "without the recital of structure."   35
> U.S.C. § 112, ¶ 6.

Id. at 1365.   Similarly, in *TI Group,* the court construed a

claim element reciting

> pumping means for pumping fuel into the reservoir,
> said means being located within the reservoir in the
> region of the opening and including a nozzle and a
> venturi tube in alignment with the nozzle, the passage
> of fuel out of the nozzle and through the venturi tube
> causing fuel to be entrained through the opening into
> the interior of the reservoir . . . .

375 F.3d at 1131.   The Federal Circuit found that:

> The claim limitation at issue recites not only a
> pumping means, but its structure ("including a nozzle
> and a venturi tube in alignment with the nozzle"),
> location ("being located within the reservoir in the
> region of the opening"), and operation ("the passage
> of fuel out of the nozzle and through the venturi tube
> causing fuel to be entrained through the opening into
> the interior of the reservoir"). While the use of the
> word "means" gives rise to a presumption that § 112,
> paragraph 6 applies, the presumption is overcome by
> the recitation of the structure needed to perform the
> recited function.

Id. at 1135.   Finally, in *Cole,* the Federal Circuit construed

the meaning of a claim element reciting "perforation means

extending from the leg band means to the waist band means

through the outer impermeable layer means for tearing the outer

impermeable layer means for removing the training brief in case

of an accident by the user . . . ."   102 F.3d at 526-27.   The

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district court had earlier found that "the 'perforation means'

element cannot qualify as a means-plus-function element under

section 112, ¶ 6, because it includes the word 'perforation' and

therefore refers to a definite structure to perform the tearing

function." *Id.* at 527. The Federal Circuit agreed, but with

somewhat more elaborate reasoning, stating:

> To invoke [§ 112 ¶ 6], the alleged means-plus-function
> claim element must not recite a definite structure
> which performs the described function. . . . [T]he
> "perforation means . . . for tearing" element of
> Cole's claim fails to satisfy the statute because it
> describes the structure supporting the tearing
> function (i.e., perforations). The claim describes
> not only the structure that supports the tearing
> function, but also its location (extending from the
> leg band to the waist band) and extent (extending
> through the outer impermeable layer). An element with
> such a detailed recitation of its structure, as
> opposed to its function, cannot meet the requirements
> of the statute. Here, the claim drafter's perfunctory
> addition of the word "means" did nothing to diminish
> the precise structural character of this element. It
> definitely did not somehow magically transform this
> element into a § 112, ¶ 6, "means-plus-function"
> element. The district court correctly recognized that
> words in a patent claim are construed as they would be
> understood by a reader skilled in the relevant art
> unless it appears that the inventor used the words
> differently.

Id. at 531.

In contrast to all those cases, here, the "console means"

is not described at all in the claim; only its function is

elucidated, namely, to "receiv[e] . . . and process[] said

capacity information to selectively display data transfer

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capacity utilization . . . ." As explained *supra*, this is not sufficient structure to avoid application of § 112 ¶ 6.

The court therefore looks to the specification for the structure executing the recited functions. The court finds that structure to be a general purpose computer as described principally at col. 8:1-31, with references to the remainder of the specification:

> Console 16 is typically implemented by a conventional personal computer as illustrated in FIG. 2 . . . . Specifically, console 16 may be implemented by an IBM-compatible personal computer preferably equipped with a mouse 67, monitor 63, keyboard 69 and base 65. Base 65 commonly contains the processors, memory and communications resources, such as internal/external modems or other communications cards for the console. The console includes software for analyzing the data collected by the probe and displaying the information to an operator as described below. Further, the console utilizes short term and long term databases to maintain data for extended periods of time. The databases may be implemented by any conventional or commercially available database. . . . The console may operate as a stand-alone console coupled to the probe, or in a client/server configuration wherein a server (i.e., a computer system as described above preferably utilizing a windows NT environment) performs substantial interactions with the probe and conveys probe information to its clients (i.e., computer systems as described above preferably utilizing a Windows 95 NT or Unix environment). The clients may also communicate with the probe directly for the data collection requests and for providing configuration parameters to the probe as described below.

483 patent at col. 8:1-31. The court notes that this structure requires hardware and/or software capable of receiving and

analyzing capacity information, and of displaying data transfer

capacity utilization, in the manner(s) described in the balance

of the specification, but also that the specification contains

important caveats warning against undue restrictions on that

structure, e.g., that "the information may be displayed in any

graphical form or other form capable of conveying the

utilization information," *id.* at col. 23:34-38, not only the

precise manner described at col. 15:56-17:53 and Fig. 11, 13-16.

The court finds Paradyne's proposed structure both incomplete

and unreasonably narrow given the plain meaning of the

specification.   On the one hand, Paradyne's construction does

not require any structure for communication between console and

probe, but such structure is clearly required for "receiving .

. . capacity information." *See id.* at col. 23:52-55 (requiring

"means suitable for transporting data" and enumerating

examples).   On the other hand, the specification clearly

contemplates using a general purpose computer, not a "special

purpose" computer, and while various other details culled by

Paradyne from the preferred embodiment -- e.g., the type of

button the user must click to begin analysis and a detailed

description of how data must be displayed -- appear in the

specification, the specification does not (and need not) limit

the invention to those particulars.   *See Telemac Corp. v.*

US/Intelicom Inc., 185 F.Supp.2d 1084, 1093-94 (N.D.Cal. 2001)

("In ascertaining whether there [is] corresponding structure .

. . the court identifies only what structure [is] necessary to

accomplish the recited function . . . .") (citing *Wenger Mfg.,*

Inc. v. Coating Mach. Sys., Inc., 239 F.3d 1225, 1233 (Fed.Cir.

2001)).

B.   The 102 Patent

The 102 patent is a method and apparatus for performing

service level analysis ("SLA") of the performance of a circuit

between two points in a network. In the 102 patent, a probe

periodically inserts special "SLA messages" into the traffic

stream, measuring both the time it takes for those messages to

travel between sites and the number of messages that actually

arrive at the proper destination. Upon sending an SLA message,

the probe begins counting the number of messages it transmits in

that circuit, and also remembers the time at which the SLA

message was sent. When the SLA message is received by a second,

downstream probe, that probe marks the current time and begins

counting the number of messages it receives on that circuit.

When the first probe sends a second SLA message, it stops

counting (and remembers when it does so); when the second probe

receives that message, it, too, stops counting (and remembers

when it does so), and various performance data is calculated and

stored.   That data is periodically transmitted to a "console"
computer where it is processed, displayed for the network
administrator, and/or archived.

       1.   ***"delimit"* and**

       2.   ***"set"***

Claim 1 describes the apparatus for acquiring the data
necessary to analyze the network's performance as described
above.   The claim states that the first probe sends an SLA
message "delimiting a set of the data traffic bound for the
second site from subsequent data traffic."   Use of the terms
"delimit" (or "delimiting") and "set" are nearly identical in
claims 32 and 51.   In all cases, it is clear that an inter-
device message is delimiting a set of data traffic.   Paradyne
nonetheless argues that delimiting means setting limits or
boundaries by using "a special character . . . called a
delimiter."   This argument is plainly nonsensical given the
intrinsic evidence: The inter-device messages themselves are
the delimiters.   Furthermore, Paradyne's construction is
inaccurate and too narrow: A special character is not specified
by the claim, nor is one required.   A series of non-special
characters, rather than a single character, could just as well
delimit one set of data from another.

Paradyne similarly attempts to restrict the definition of "set," arguing that a set is "a number of things of the same kind that belong or are used together." The claim, however, makes perfectly clear that "set" here always refers to "a set of the data traffic." The term is never used in any other sense in the patent. Paradyne's construction is therefore either too narrow (if all data traffic is not "of the same kind" and/or "belong or [be] used together"), or introduces surplusage (if all data traffic is, in fact, "of the same kind that belong or are used together").   The court therefore adopts VNO's construction of the words "delimit" and "set," namely, that the terms carry their ordinary and customary meanings.

3.   *"protocol data units (PDUs)"*

Claims 70, 78, and 85 refer to protocol data units, or PDUs. Claim 70 describes a "method for measuring data delivery performance" of a circuit between two sites. The first step of that method is to maintain, at the first site, a count "of a number of [PDUs] bound for the second site" ("OFF_A," where "OFF" is short for "offered") and a count of "a number of PDUs originating from the second site that are delivered . . . to the first site . . . ."   ("DEL_A," where "DEL" is short for "delivered").   Likewise, at the second site, counts are maintained of "a number of PDUs bound for the first site"

("OFF$_B$") and "a number of PDUs originating from the first site
that are delivered . . . to the second site" ("DEL$_B$").   In other
words, each site keeps track of how many PDUs it sends and how
many it receives.   Those counts can then be analyzed to
determine how often data is properly delivered between the two
sites.

VNO defines PDUs as "units of data being transmitted."
Paradyne contends that it means "information that is delivered
as a unit between peer entities of a network containing control
information, address information and other data."   Paradyne's
definition is barely more restrictive than VNO's, and
unnecessarily so.   The restriction that the PDUs be transmitted
"between peer entities of a network," is an unnecessary
complication.   First, the origin and destination of the data
have nothing to do with the nature of the data unit.   Second,
the patent nowhere defines the term "peer entities of a
network," and if it did, there is no reason to assume that the
patent was to be restricted in this way; two entities on a
network could exchange data in the manner described despite not
being "peers" -- unless "peer" means simply another entity on
the network that can transmit PDUs, in which case the
restriction is redundant.   The phrase "containing control
information, address information and other data" is also unduly

restrictive in that PDUs need not necessarily contain any "other

data."[7]   Furthermore, the phrase inappropriately introduces

surplusage to the extent that, as Paradyne points out in its own

brief, data exchanged over a network using a communications

protocol must, in any practical sense, contain control and

address information.   *See* paper no. 61, at 21.   The court

therefore adopts VNO's construction.

4.   *"measure of PDU delivery performance"*

The last step of the method described in Claim 70 is to

"comput[e] a measure of PDU delivery performance" of a circuit

"from the counts OFF_A, OFF_B, DEL_A and DEL_B."   VNO contends that

this phrase has an ordinary meaning, namely, "a value indicating

the data delivery performance, including but not limited to the

data delivery ratio from a site A to a site B and the data

delivery ratio from the site B to the site A."

Paradyne argues that the phrase, divorced from the balance

of the claim language, has no ordinary meaning to those skilled

in the art, and defines the phrase as "a two-way performance

metric for a virtual circuit connecting two sites, using the

---

[7] Paradyne appears to drop this argument in its reply brief,
misquoting the Joint Statement by stating that PDU should mean
"information that is delivered as a unit between peer entities
of a [] network and that contains control information, address
information and *may* contain user data."   Paper no. 61, at 21
(italics added).

equation DDR = (?DEL$_A$ + ?DEL$_B$)/(?OFF$_A$ + ?OFF$_B$).”   As VNO notes,

however, because the specification sets forth at least two

formulas that might be used to compute this value -- "one-way

DDR" and "two-way DDR," *see* 102 patent at col. 10:36-41, 11:12-

17, 14:39-45 -- Paradyne's definition is impermissibly

restrictive.   The text of the claim does not impose any single

formula.   Paradyne also argues that because the computation is

made "from the counts OFF$_A$, OFF$_B$, DEL$_A$ *and* DEL$_B$," (italics added),

any computational definition must make use of all four

variables.   As a technical matter, this argument borders on

frivolity, as any computation could make literal use of all four

variables while in reality ignoring them, e.g., by multiplying

the otherwise-unused variables by zero and adding that result to

the desired calculation.   Because there are multiple ways to

indicate data delivery performance, including the two cited as

examples by VNO's proposed definition, the court adopts that

definition.

> **5.   *"time T$_1$", "time T$_2$", "time T$_3$", "time T$_4$"***

Claim 74 describes a method for "calculating a round trip

delay of data transmitted . . . between first and second sites"

by "transmitting a first message [from the first site to the

second] . . . at time T$_1$, the first message being received . .

. at time T$_2$," then "transmitting a second message [from the

second site to the first] . . . at time T_3, the second message being received at time T_4," "transmitting a third message [from the first site to the second] . . . containing timestamp information indicating values of the transmit time T_1 of the first message and the receive time T_4 of the second message," and finally "computing the round trip delay using the values of times T_1, T_2, T_3 and T_4." In other words, the method is for each of two sites in a network to remember exactly at what time messages are sent and received by that site, and then to use that information to measure how long it takes for a message to travel from the first site to the second and back again.

Unsurprisingly, VNO defines these four terms as "a time at which" the message is sent or received from one "data acquisition device" to another. Surprisingly, Paradyne quibbles with these definitions, asserting that the terms should mean "the actual" time at which a message is transmitted or received, "measured relative to a local clock of" the probe recording the time. The court sees no reason why "actual" time need be the baseline for measuring round trip delay, nor why a "local clock" be used for those measurements. Those restrictions are not stated in the language of the patent, and the court will not unnecessarily import them from the specification. The court therefore adopts VNO's definitions of all four of these terms.

6.   **"*message type field*"**

Claim 78 describes a "data transmission structure" for transmitting messages between two sites. By this the patent refers to the structure of the SLA messages that are sent back and forth between two sites to measure delivery performance. The structure includes two fields: a "message type field" and a "count field." The claim states that the message type field "identif[ies] the inter-device message as a particular message within the sequence" while the count field indicates the number of PDUs offered by the sending site ("OFF_A" or "OFF_B"). This two-field structure is capable of being encapsulated in a single PDU. Claim 85 uses the phrase is the same manner.

VNO states that "message type field" means "a data area that identifies the type of a message." Paradyne counters that it means "a data field that indicates the current state of the overall SLA exchange, i.e., whether the message is message M_1, M_2, M_3, or M_4 in the four message sequences that is illustrated in Fig. 2 of the patent."

Once again, the difference between these definitions is semantic. Because the claim states that the message type field identifies the message as "a particular message within the sequence," Paradyne's additional restriction on the definition of "message type field" is surplusage that serves only to muddy

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the waters by tying the definition to a figure supplied for the sake of describing the preferred embodiment. The court therefore adopts VNO's definition.

7. *"inter-device message transmission structure"*

Claim 85 describes a method for transmitting between two sites messages that contain "data relating to the transmission performance" of the circuit between the two sites. The first step in that method is to "form[] each of the inter-device messages in the sequence in accordance with an inter-device message transmission structure," so that each of the messages can be encapsulated in a single PDU. The structure consists of a message type field and a count field as discussed *supra*.

VNO states, with obvious redundance, that an inter-device message transmission structure is a "data structure defining inter-device messages." Paradyne offers a narrower definition, stating that it means "various data fields that remain consistent from message[] to message in the four-message sequence of M_1 – M_4."

Like many of the disputed terms, defining this one in a vacuum, as necessitated by Paradyne's challenge, hardly seems worth the ink. The claim describes the structure in detail, stating that "each inter-device message includes: a message type field identifying the inter-device message as a particular

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message within the sequence; and a count field for transmitting

an indicator of a number of protocol data units (PDUs) offered

for transmission . . . ."   102 patent at col. 36:2-6.

Paradyne's insistence that the data fields "remain consistent

from message[] to message" is therefore redundant for the

purpose of claim construction; VNO has asserted claims neither

for inter-device message transmission structures in general nor

for any such structure other than the one described in paragraph

(a) of Claim 85.   Furthermore, Paradyne does not explain with

what or in what sense the data fields must "remain consistent,"

rendering its alternative definition unusably vague.   Finally,

Paradyne's insistence that the definition of the phrase "inter-

device message transmission structure" include reference to the

four message sequence described elsewhere in the patent is

equally needless.   The plain and ordinary meaning of the phrase

is   sufficiently   clear.   The   court   therefore   adopts   VNO's

construction.

C.   The 998 Patent

The 998 patent is a method and apparatus for measuring a

network's quality of service.   Specialized service verification

equipment ("SVE") units, like probes, are placed in the path

along which data travels in the network.   An SVE unit inserts

various messages, called test cells (not unlike the SLA messages

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of the 102 patent), into the network traffic stream. The test cells are then received by a second SVE unit. One such cell, the "test initiation cell," indicates to the receiving SVE that a test has commenced, whereupon the receiving SVE begins logging performance data using various counters. After a predetermined amount of data is sent, another test cell, the "test termination cell," is sent, telling the receiving SVE that the test has ended. The receiving SVE then compiles the data it has collected, and that data can be analyzed to determine the quality of service, or "QoS," between the two points.

> **1.** ***"cell"***
>
> **and 2.** ***"test initiation cell"***
>
> **and 3.** ***"test termination cell"***

Claim 1 describes a "method of testing QoS in an in-service communications link . . . ." One SVE unit inserts a "test initiation cell" into a data stream. A second SVE unit receives that cell, then receives a data stream while collecting statistical data about the QoS of the link. Finally, the first SVE inserts a "test termination cell." These terms reappear in claims 7 and 15.

VNO defines "cell" as "a unit aggregation of data routed between an origin and a destination across a network, and at least refers to, but is not limited to, a cell, datagram, frame,

or packet associated with any technology that supports virtual circuits." The 998 patent specification expressly defines cell using these words. *See* 998 patent at col. 4:48-54.

Paradyne nonetheless contends that cell must mean "a packet with a fixed length (each cell has a 5 octet header and 48 octets of data) that can be used in an ATM network." Paradyne argues that, because VNO's chief engineer stated at deposition that "a cell is usually . . . a fixed length unit of data," VNO's own representative has somehow disclaimed the express definition in the 998 patent. The law is clear: An inventor may choose to be his or her own lexicographer and use terms in a manner other than their ordinary meaning so long as those alternative meanings are clearly disclosed in the patent specification or file history. *Hemphill v. McNeil PPC,* Inc., 134 F.Supp.2d 719, 725-26 (D.Md. 2001) (citing *Vitronics,* 90 F.3d at 1582). The engineer at deposition did not disclaim the definition in the specification. Indeed, he stated that cells are "usually" of fixed length and, contrary to Paradyne's definition, *do* appear in networks other than ATM networks. *See* paper no. 61, App. C, at 31 (Excerpts from Individual Deposition of Thomas Nisbet, at 74-75). For Paradyne to contort that testimony to assert that the engineer's explanation of the "usual[]" definition should somehow trump the express text of

the specification is simply misleading. VNO's construction is the appropriate one.

Paradyne admits that VNO's definitions of "test initiation cell" and "test termination cell" are adequate if the court adopts VNO's definition of "cell." The court therefore adopts VNO's definitions of those terms as well: VNO defines "test initiation cell" as "a cell that is used to begin a test" and "test termination cell" as "a cell that is used to end a test."

Also before the court is VNO's uncontested assertion that the language of claim 15 contains a typographical error, and should be corrected, replacing the phrase "test initiation cell" with "test termination cell." It has been brought to the court's attention that the Patent and Trademark Office has issued a Certificate of Correction. Paper no. 90. That correction, however, is not retroactive to this lawsuit. *See* 35 U.S.C. § 254 (after a Certificate of Correction is issued, "[e]very such patent, together with such certificate, shall have the same effect and operation in law on the trial of actions for causes *thereafter* arising as if the same had been originally issued in such corrected form." (italics added)). This court, however, can correct such errors retroactively, if "(1) the correction is not subject to reasonable debate based on consideration of the claim language and the specification and

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(2) the prosecution history does not suggest a different interpretation of the claims." *Novo Indus., L.P. v. Micro Molds Corp.,* 350 F.3d 1348, 1357 (Fed.Cir. 2003); *see Hoffer v. Microsoft Corp.,* 405 F.3d 1326, 1331 (Fed.Cir. 2005) ("When a harmless error in a patent is not subject to reasonable debate, it can be corrected by the court, as for other legal documents.") (citing *Novo Indus.*, 350 F.3d at 1356-57). Here, the correction is not subject to reasonable debate: The uncorrected claim is nonsensical, and both the balance of the claims and specification make clear that the claim was intended to be read as corrected. Likewise, VNO asserts, and Paradyne does not contest, that there is nothing in the prosecution history to suggest a different interpretation of the claim. That Paradyne does not challenge the correction either in its brief or in the Joint Statement, and that the Patent and Trademark Office has issued a Certificate of Correction, both lend credence to this position. The court therefore finds that the word "initiation" in claim 15 is an error, and hereby corrects the claim, substituting "termination" for "initiation."

> ### 4. *"statistical data regarding the QoS of the communication link"*

Claim 1 states that, in the period after the initiation cell is sent but before the termination cell is sent, the receiving

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SVE unit collects "statistical data regarding the QoS of the communications link."   The phrase reappears in claim 16. Subsequent claims describe methods wherein the statistical data collected is, alternatively, "a checksum of each of the number of cells of the customer's data stream" (claim 3) and "a timestamp of each of the number of cells of the customer's data stream" (claim 4).

The parties agree that their dispute centers primarily on the construction of the phrase "statistical data."   VNO contends that the phrase carries an ordinary meaning, namely, "a collection of data," while Paradyne asserts that statistical data must be both "expressed in quantities" and "computed from sample(s) of data."

The phrase "computed from sample(s) of data" is an unnecessary restriction, one which Paradyne does not bother to defend in its brief.   Whether data is collected in raw form, in samples, or by any other method, is immaterial to the question of whether it is "statistical" in nature.

Paradyne turns to the American Heritage Dictionary, Second College Edition (1985), to show that the "statistical data" collected must be numerical: that dictionary defines "statistic" as "1. A numerical datum. 2. An estimate of a parameter . . . obtained from a sample."   Paper no. 61, Ex. B, at 130.   VNO

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argues that, because the specification clearly provides examples

of non-numerical data being collected, it has effectively

defined "statistical data" to include any collection of data.

As noted *supra*, however, the specification "functions as a

dictionary to explain the claimed subject matter and define the

terms used in the claims." *Minnesota Min. and Mfg. Co.,* 976

F.2d at 1566. Here, the specification provides many examples of

such data:

> Transmitting SVE 10 measures and stores QoS data . .
> . . In one embodiment, the data may include any or
> all of the cell header, the cell payload, the current
> time, the elapsed time between each cell, and the
> number of cells. In one embodiment, a copy of all
> cells transmitted are stored. In another embodiment,
> [the transmitting SVE] computes a checksum for each
> cell payload, and stores the checksum instead of the
> cell payload data. . . . In another embodiment, all
> cells transmitted are stored with a time stamp. In
> another embodiment, the data required to store the
> time stamp is compressed by calculating the elapsed
> time from the last cell reception. In another
> embodiment, a crc32 payload data checksum is stored
> along with a elapsed timestamp . . . .

998 patent at col. 5:46-62. Paradyne quibbles that this

paragraph refers to "data," not "statistical data," but context

makes clear that this portion of the specification, which

discusses "QoS data" that is measured and stored, describes

possible embodiments of the claims using the disputed phrase.

Paradyne also fusses over VNO's use of the word "collection,"

arguing that "a single instantiation of data . . . is not even

a collection of data," but cites no authority for the proposition that a collection must contain more than one (or even more than zero) elements. Most importantly, the paragraph shows that proposed embodiments clearly contemplate "statistical data" to include non-numerical data. Paradyne protests that "[t]he danger inherent in Visual's approach is that it does not really have a limitation that relates to the 'statistical' nature of the data described in the claim," paper no. 61, at 33; but the court will not interpret the text of the claim in such a way as to disallow an embodiment described in the specification when another reasonable interpretation exists. The specification informs interpretation of the claim language, not the other way around. The court therefore accepts the more general interpretation embraced by VNO.

The parties also disagree as to the meaning of the phrase "regarding the QoS of the communication link." VNO contends that this phrase means, in ordinary and customary fashion, that the data must be "related to" the QoS of the link. Paradyne states that statistical data is information that is "indicative of the QoS" of the link, but Paradyne's objection to VNO's "related to" language stems from its objection to VNO's "collection" language, *see id.* at 32, which the court rejects, *see supra*. In any event, to state that the data must be

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"indicative of the QoS" is nearly redundant, as the claim is for collecting "statistical data regarding the QoS of the communications link." It is also unnecessarily restrictive. That the data is "computed from sample(s) of data" is also redundant and unnecessarily restrictive, as all the data collected is "sample" data insofar as it is sampled from the data stream. The court, finding the "collection" language acceptable, adopts VNO's definition of this phrase as well.

5.   *"service customer"*

Claims 7 and 15 describe systems for testing a link between two "service customer[s]." VNO states that the phrase "has its ordinary and customary meaning such as a user of an in-service communications." Paradyne contests this definition, asserting that the phrase means "a purchaser of communications services." The difference seems utterly immaterial to any conceivable question of interpretation regarding the patented technology. Nonetheless, the court finds that "service customer" carries its ordinary and plain meaning. VNO notes that the specification provides examples of a service customer renting or contracting for services, as opposed to purchasing them, although renting and contracting might simply be considered alternative forms of purchasing. VNO's more general point, however, is well taken: Users can obtain services in myriad ways that do not involve

"purchase," including by trade, by coerced arrangement (e.g., a parent company's directive or legal injunction requiring that service be rendered), or as a gift (e.g., a charitable donation). In context, none of these would be excluded from the ordinary and customary definition of "service customer." Therefore the court will not read the patent to exclude users who are not "purchasers."

6.   **"*checksum of each of the number of cells of the customer's data stream*"**

Claims 3 and 16 both describe methods where the statistical data collected is "a checksum of each of the number of cells in the customer's data stream." The Joint Statement reflects that the parties dispute the meaning of this term only with regard to Claim 16, although the language used is identical and the context nearly so.

VNO contends that the phrase means "a computed value that depends on the customer's data stream." Paradyne counters that the phrase means

> a calculated value [of each of the number of 'cells,' of the customer's 'data stream,' as the terms are properly construed above] that is used to test data for the presence of errors that can occur when data is transmitted, calculated for a given set of data by sequentially combining all the bytes of data with a series of arithmetic or logical operations.

Joint Statement at A-4 (brackets in original). In short, the parties dispute the meaning of the word "checksum."

"Checksum" is not defined in the patent. The court therefore turns first to its common and ordinary meaning, if any. VNO presents none in its brief. Paradyne quotes *Novell's Complete Encyclopedia of Networking*, which states that a checksum is "a simple error-detection strategy that computes a running total based on the byte values transmitted in a packet, and then applies a simple operation to compute the checksum value."

VNO counters that "nowhere in the specification does it say that the claimed invention uses a checksum to test for the presence of errors."   VNO argues that Paradyne's proposed definition excludes an embodiment in the specification which states that the checksum is used "as a types [sic] of QoS data that is . . . used to determine QoS," paper no. 52, at 48, suggesting that while error detection is one use of a checksum, it is not the only one possible, nor the only one contemplated by the patent, as the specification calls for the collection of checksum data "as a [type] of QoS data." That checksum data has multiple uses, however, does not contribute to the definition of the term.   VNO's   other   arguments   are unavailing. VNO asserts, rather baldly, that "the meaning of the claim term

'checksum' is apparent from the intrinsic evidence," but the court finds no meaning forthcoming from that evidence. VNO also notes that the specification mentions how the term "checksum" is used. In one embodiment, an SVE "computes a checksum for each cell payload, and stores the checksum instead of the cell payload data. This has the advantage of reducing the amount of test data stored and transmitted, and also ensures service customer data privacy." 998 patent at col. 5:52-57. In another, "a crc32 payload data checksum is stored along with a elapsed timestamp thereby representing the time and data associated with a 53 byte ATM cell in 6 bytes." *Id.* at col. 5:60-63. Neither of these references to the term, however, contributes meaningfully to its interpretation: The first merely explains another way in which the checksum, once calculated, can be used, while the second gives but one example of how it might be calculated by referring to a specific type of checksum, i.e., one calculated using the "crc32" algorithm.

Because no contradictory definition is in evidence, the court accepts Paradyne's suggested definition of "checksum," and, by extension, Paradyne' construction of the disputed phrase.

V.   Analysis of Paradyne's Claims

   A.   The 674 Patent

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The 674 patent is a system and method for performing diagnostics along a virtual circuit in a frame relay network without disrupting the network.

Each virtual circuit in a frame relay network can carry multiple streams of data simultaneously. This patent refers to that capability by stating that the virtual circuit contains "a plurality of logical circuits." For instance, a virtual circuit might carry both audio and video between the same two points; the audio data would travel on one logical circuit, or channel (the parties use the terms "circuit" and "channel" interchangeably), while the video data would travel on another. The 674 patent performs diagnostics by setting up, in any given virtual circuit in a frame relay network, an additional logical channel called the "diagnostics channel," which is used exclusively for sending and receiving test commands between two points so that the processors on each end can work in concert to perform various diagnostic testing regarding the connection.

    1. *Whether the preamble in claim 1 is limiting*

and **2.** *"providing non-disruptive diagnostics between a first device and a second device"*

and **3.** *"the virtual circuit comprising a plurality of logical circuits"*

Claim 1 states, in its entirety:

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A method for providing non-disruptive diagnostics
between a first device and a second device in
communication through a virtual circuit of a frame
relay network, the virtual circuit comprising a
plurality of logical circuits, the method comprising
the steps of:

defining one of the plurality of logical circuits
as a diagnostic channel by assigning it a
unique channel address;

defining one or more test sequence;

selecting one or more of the test sequence by the
first device and transmitting it to the
second device across the diagnostic channel;

receiving and identifying the one or more test
sequence transmitted by the first device;

executing appropriate steps in response to the
one or more test sequence received from the
first device;

identifying if the executed steps reflect a fault
in the virtual circuit.

674 patent at col. 16:51-17:2.

The preamble of claim 7 is identical to that of claim 1

except that the phrase "the virtual circuit comprising a

plurality of logical circuits" is omitted.   The preamble of

claim 27 states that the claim describes a "computer readable

storage medium containing program code for controlling" the

method recited in claim 7.

Paradyne contends that the language of these preambles is

general and does not limit the claims.   VNO, however, asserts

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that these preambles constitute necessary structural limitations. Both are correct in part.

The phrase "non-disruptive diagnostics" is descriptive, not limiting in any structural sense. The purpose of the invention is to "provid[e] non-disruptive diagnostics." As noted *supra*, a preamble is "denied the effect of a limitation where . . . the preamble merely state[s] a purpose or intended use." *Bell Comm. Research,* 55 F.3d at 620-21.

On the other hand, "where a patentee uses the claim preamble to recite structural limitations of his claimed invention, . . . courts give effect to that usage." *Rowe,* 112 F.3d at 478. The phrase "between a first device and a second device in communication through a virtual circuit of a frame relay network" recites specific, structural limitations -- that there are two devices, connected by a virtual circuit in a frame relay network -- and therefore gives "life, meaning and vitality to the claim[]." *Bell Comm. Research,* 55 F.3d at 620. Without it, the balance of the claims simply make no sense. Claim 1 refers to "the first device" and "the second device" without any indication of how they might be connected, and none of the subordinate claims (claims 2 through 6) shed any additional light. Claims 7 and 27 are similarly disembodied without the two-device structure provided in their respective preambles.

Likewise, post-preamble language in claims 1, 7 and 27, and subordinate claims 6 and 13, all refer to "the virtual circuit," a reference to the structure provided by the language of the preambles. Finally, the phrase "frame relay network" appears only in the three preambles, and the language imposes an obvious structural limitation. The preamble of all three claims is therefore interpreted to limit each claim by requiring exactly two devices, connected only through a virtual circuit, and only on a frame relay network.

Likewise, the phrase "the virtual circuit comprising a plurality of logical circuits," which appears only in the preamble of claim 1, is clearly a structural limitation; without it, the post-preamble phrase "defining one of the plurality of logical circuits" has no antecedent.

Finally, the parties disagree as to the meaning of the phrase "the virtual circuit comprising a plurality of logical circuits." In the Joint Statement, Paradyne contends that the phrase means "the virtual circuit, properly construed above, has two or more connections measured from the perspective of the operating system rather than the physical means of interconnection." Joint Statement at A-18. In its brief, however, Paradyne appears to back away from that language, stating instead that the phrase means simply "a logical path

with two or more channels." VNO counters that the phrase means that "the logical path has two or more channels and each logical channel is created by adding a secondary channel flag and secondary header to the user information field."

Because the parties now agree that the phrase implies a logical path with two or more channels, the court focuses on the additional limitation that "each logical channel is created by adding a secondary channel flag and secondary header to the user information field." Those limitations are presumptively improper, as the language of the claim makes no reference to them. *See Johnson Worldwide Assocs. v. Zebco Corp.,* 175 F.3d 985, 989 (Fed.Cir. 1999) (noting the "heavy presumption in favor of the ordinary meaning of claim language"). VNO nonetheless asserts that, read together, the specifications of the 674 patent and Patent No. 5,654,966 ("the 966 patent"), of which the 674 patent is a continuation-in-part, "make it clear that the very character of the invention of 'a plurality of logical channels' requires the limitation of secondary channel flags and secondary headers which are inserted into each frame to be a part of every embodiment thereof." Paper no. 62, at 17. VNO charges that "logical channel" is "nothing more than a conceptualization created by Paradyne to describe the system in

the '966 patent, and then improved upon in the '674 patent."
Id. at 15-16.

VNO's assertions are unsupported. Nothing in either the
claim language or the specification of the 674 patent indicates
that Paradyne intended its claims in 674 to apply only to
channels created in the manner imagined in 966. How a virtual
circuit's logical channels are created or maintained is of no
concern to this claim. The court therefore adopts Paradyne's
construction as stated in its brief: A "virtual circuit
comprising a plurality of logical circuits" is a "logical path
with two or more channels."

> **4. *"defining one of the plurality of logical
>   circuits as a diagnostic channel by assigning it
>   a unique channel address" (claim 1)***

**and   5. *"defining a diagnostic channel by assigning it a
>   unique channel address" (claims 7 and 27)***

Paradyne defines the phrase "defining one of the plurality
of logical circuits as a diagnostic channel by assigning it a
unique channel address" to mean "[d]istinguishing one of the
connections [measured from the perspective of the operating
system rather than the physical means of interconnection] as a
path of communication for assessing malfunction or fault by
specifying a special set of characters identifying the logical

connection (as opposed to the normal customer data traffic)"
(brackets in original). VNO counters that the phrase means
"defining one of the plurality of logical circuits as a
diagnostic channel by assigning a unique value that identifies
the diagnostic channel and is placed in the user information
field of each packet exclusive of a SNAP header." The two
definitions are largely the same: The parties do not seriously
quibble over Paradyne's operating system-based definition of
"logical" or the insignificant differences in the parties'
definitions of "unique channel address" and "diagnostic." The
court therefore focuses on VNO's attempt to import from the
specification the limitation that the unique channel address
must be "placed in the user information field of each packet
exclusive of a SNAP header." This dispute mirrors that over the
meaning of "logical channel," *supra*, in that VNO imports the
limitation based on language in the 996 patent. The result is
the same. The proposed limitation is presumptively improper, as
the language of the claim makes no reference to it, *see Johnson
Worldwide,* 175 F.3d at 989; and here, as in the previous
dispute, nothing in either the claim language or the
specification of the 674 patent indicates any requirement that
the diagnostic channel be identified in a specific manner or
that it involve either the user information field or the SNAP

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header. As Paradyne notes in its brief, "[t]he user information field and the SNAP header are parts of the packet frame. . . . [W]hen describing the data frame suitable for use within the invention, the inventors were careful to indicate that 'other frame formats compatible with a frame-relay network are well within the scope of the present invention.'" Paper no. 51, at 21 (quoting 674 patent at col. 9:13-14). The proposed limitations are therefore rejected, and the court adopts Paradyne's construction of the disputed phrase.

The parties dispute, for the same reasons, the meaning of the nearly identical phrase appearing in claims 7 and 27; the only difference is the absence of the words "one of the plurality of logical circuits" in these claims. For the same reasons, the court rejects VNO's improper limitations regarding the use of the "user information field of each packet exclusive of a SNAP header."

> **6.**   ***"executing appropriate steps in response to the one or more test sequence received from the first device"***

Paradyne construes this phrase, which appears only in claim 1, to impose the limitation of "carrying out suitable measures as a reaction to acquiring one or more commands for checking something where the command(s) originate at the first unit."

VNO contends that the phrase means "executing steps in response to the one or more test sequences received from the first device, wherein said steps executed are specific components of the particular test being conducted."   Both are relatively innocuous reflections of the plain meanings of the terms in the phrase, but VNO's adds the limitation that the steps are "specific components of the particular test being conducted." To the extent that the "specific components" limitation is meaningful, it is an improper importation of a limitation where none exists: Nowhere in the claim language or context is it suggested that "appropriate steps" need include only components of a test.   The court therefore adopts Paradyne's definition.

B.   The 082 Patent

As explained *supra*, in both frame relay and ATM networks, data is sent in discrete packets along a virtual circuit.

Also as described *supra*, each virtual circuit can carry multiple logical channels.   Splitting up a virtual circuit to accommodate multiple logical channels in this way is called "multiplexing."

The 802 patent states a system and method for multiplexing a virtual circuit in ATM or hybrid frame relay/ATM networks. (Multiplexing a virtual circuit in a homogenous frame relay network is prior art.)   The patent also designates one of the

newly created logical channels as a diagnostics channel, used for performing diagnostics on that circuit in essentially the same fashion as described in the 674 patent.

           1.   ***Whether the preamble of claim 1 is limiting***

and   **2.**   ***"non-disruptive diagnostics"***

The preamble of claim 1 of the 802 patent explains that the claim is for "[a] system for communicating data traffic between a first device and a second device while providing non-disruptive diagnostics therebetween . . . ." The preamble of claim 25, which describes a corresponding method, is nearly identical to that of claim 1.

The preamble does not limit the claim. There is no structure in the preamble that is not restated with greater specificity in the balance of the claim language, which specifies "means for transmitting the data traffic between the first device and the second device, the means for transmitting the data traffic including a virtual circuit across hybrid ATM/frame relay network . . . ." 802 patent at col. 16:54-57. That language makes clear that the claim involves transmitting data traffic across only two devices (in contrast to the preamble of claim 1 of the 674 patent, *supra*, where the claim's preamble supplied the only indication that the patent described a method involving only two devices).

As in the 674 patent, the phrase "non-disruptive diagnostics" is descriptive of the purpose of the claimed system, but provides no particular structural limitation. Because the phrase clearly does not impose a structural limitation, the court need not interpret its precise meaning.

3.   *"plurality of logical channels"*

Paradyne states that the phrase, which appears in claims 1 and 25, carries its ordinary and customary meaning, namely, "more than one software-based connection through which data may travel, regardless of the number of any physical connection(s)." VNO counters that it means "a logical path for the transmission of data that appears to the user to be a dedicated point-to-point circuit, wherein the logical path has two or more channels and each logical channel is created by adding a secondary channel flag and secondary header to the user information field."

This is the same dispute as discussed *supra* regarding the phrase "plurality of logical circuits" in the 674 patent. Here, as there, VNO's construction improperly adds limitations specifying how each logical channel must be created. For the same reasons, the court rejects those limitations and adopts Paradyne's definition.

> 4. ***"means for transmitting the data traffic between***
>
> ***the first device and the second device, the means***
>
> ***for transmitting the data traffic including a***
>
> ***virtual circuit across hybrid ATM/frame relay***
>
> ***network, the virtual circuit having a plurality***
>
> ***of logical channels"***

Because this phrase, which appears only in claim 1, begins with the words "means for," there exists a rebuttable presumption that § 112 ¶ 6 applies to the claim. *Apex,* 325 F.3d at 1371-72. Accordingly, the court asks whether "including a virtual circuit across hybrid ATM/frame relay network, the virtual circuit having a plurality of logical channels" recites sufficient structure to perform the function of "transmitting the data traffic," and examines whether the phrase has "a reasonably well understood meaning in the art, keeping in mind that a claim term need not call to mind a single well-defined structure." *Id.*

Paradyne states that this phrase is "not a means plus function claim because the claim language itself discloses sufficient structure for 'transmitting the data traffic between the first device and the second device,' namely, a 'virtual circuit across a hybrid ATM/frame relay network.'" Joint Statement at A-16. Paradyne therefore construes the claim as

simply "including a virtual circuit . . . deployed across a network that uses a mixture of [ATM] and frame relay communication types, where the virtual circuit has a plurality of logical channels." *Id.* VNO disagrees, contending that the claim is a means plus function. VNO agrees that the function of transmitting data traffic between the two devices is lent structure by a virtual circuit across the hybrid network, but VNO argues that "a virtual circuit is merely a path and does not have sufficient structure to transmit data," and that a complete structure must include not only the virtual circuit, but also a transmitter device, to cause data to be transmitted across the virtual circuit path. Paper no. 62, at 27. VNO therefore contends that the claim, as subject to § 112 ¶ 6, must include not only a virtual circuit, but the corresponding transmission structure from the specification, namely, "the ATM DSU 113 shown in Figure 3, including the operating logic 188 together with the channel logic 189, which are stored on microprocessor 185, and which transmit the frames shown in Figures 4 and 6, and equivalents thereof." *Id.*

Oddly, VNO seems to overlook that the disputed phrase also contains the words "hybrid ATM/frame relay network," stating that "Paradyne merely asserts that a *virtual circuit* has sufficient structure . . . ." *Id.* (italics added). Paradyne

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correctly notes this oversight in the handout materials it
provided during the *Markman* hearing, asserting that the phrase
"a virtual circuit across hybrid ATM/frame relay network"
recites "[n]ot merely the circuit, but the circuit in an *active*
packet switching network."   Paradyne Hearing Handout at 63
(italics added).   The same materials also note that VNO's
hearing materials seem to be in agreement, as they clearly state
that "[a] switching network is a matrix of switches or switching
elements . . . connected by transmission lines" and that "*[t]he
switches switch or transfer data* from one transmission line to
another to route the data towards its destination."   VNO Hearing
Handout at 3 (italics added).

The court agrees.   As even VNO acknowledges in its own
hearing materials, a network is commonly understood in the art
to include not only communications links, but means for
transmission across those links.   The court therefore finds that
the claim recites sufficient structure to perform the function
of transmitting the data traffic, rendering application of § 112
¶ 6 inappropriate.

5.   *"the diagnostic logical channel"*

Paradyne defines "diagnostic logical channel" as "the
software-based connection that facilitates the detection of
potential fault or malfunction in the virtual circuit, as

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opposed to facilitating the transmission of normal customer data traffic."   VNO contends that the phrase means "a reserved logical channel of a virtual circuit, which is used exclusively for the process of detecting a malfunction or a failure to operate normally."   The two definitions are hardly different, and Paradyne appears unconcerned with any possible differences between the two.   VNO argues that such a channel must be used "exclusively" for diagnostics because the specification states that "the present invention dedicates or reserves one of the plurality of logical channels that are multiplexed upon a single virtual circuit as the diagnostic logical channel . . . .   This reserved channel . . . is used exclusively for channel diagnostics . . . ."   802 patent at col. 10:57-63.   "The specification functions as a dictionary to explain the claimed subject matter and define the terms used in the claims." *Minnesota Min. and Mfg.,* 976 F.2d at 1566.   Furthermore, Paradyne's definition also implies exclusivity (". . . *as opposed* to facilitating . . . normal customer data traffic" (italics added).   The court therefore adopts VNO's definition.

> **6.   *"designating one of the plurality of logical channels for diagnostic communication by assigning a unique diagnostic channel address"***

The parties agree that this phrase has substantially the same meaning as the phrase "defining one of the plurality of logical circuits as a diagnostic channel by assigning it a unique channel address" in the 674 patent. *See supra.* As in that dispute, and for the same reasons, VNO's construction improperly imports from the specification the limitation that the unique value must be "placed in the user information field of each packet exclusive of a SNAP header," and the court again adopts Paradyne's construction.

C.   The 219 Patent

The 219 patent describes a method and system for allowing customers to dynamically reconfigure their frame relay networks to increase fault tolerance. In a frame relay network, "frame relay user equipment" transmits data between a computer and the rest of the network. In the 219 patent, "frame relay access unit equipment," not unlike the probes described *supra*, is placed between the user device and the rest of the network. The access unit is also connected to a second, separate network, which can be used as a backup path when, for whatever reason, the primary network fails. The access unit intercepts and retransmits data, and performs diagnostics over a dedicated channel in the virtual circuit as described in the 674 patent to evaluate network performance. If the primary network fails, the

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access unit automatically establishes and utilizes a
communications link over the secondary network until the primary
link begins performing properly again, thereby maintaining
service availability for the user.

The parties dispute terms and phrases only in claim 1.

1. *Preamble: "providing a fault-tolerant frame-relay communications network"*

Paradyne contends that this preamble is not a limitation but
merely a description of the purpose of the claim. VNO states in
its brief that it agrees. *See* paper no. 62, at 32 n.24. The
court also agrees: The balance of the text of the claim makes
clear that fault tolerance is a goal, to be achieved by "using
the diagnostic channel to diagnose a failure in the PVC; and
dynamically establishing a secondary communications link . . .
and directing further communications . . . over the secondary .
. . link." 219 patent at col. 19:43-20:6. A goal stated in a
claim preamble does not, itself, impose a structural limitation
on a claim. The court therefore finds this preamble not to
limit the claim.

2. *"establishing a plurality of logical communication channels for communicating through the PVC"*

The parties agree that the dispute over this claim mirrors that of the parallel phrase appearing in the 674 patent. As in that dispute, VNO contends that each logical channel must be "created by adding a secondary channel flag and secondary header to the user information field of a frame." As in that dispute, and for the same reasons, VNO's construction improperly imports from the specification the limitation regarding how the channel must be created. Aside from those limitations, the two definitions do not differ substantially. The court therefore adopts Paradyne's construction.

3.   *"at least one channel of the plurality of channels is reserved as a diagnostic channel used exclusively for performing diagnostics"*

Paradyne states that the phrase means that "[o]ne or more of the software-based connections are set aside for the sole purpose of carrying out actions relating to investigation or analysis of the nature of a condition, situation, or problem." VNO counters that the phrase means "one or more of the logical channels is set aside for the sole purpose of detecting a malfunction or a failure to operate normally." Because the parties agree as to the meanings of many of the terms in this phrase ("at least one," "reserved," "used exclusively"), and because the parties' definition of "channel" as used here is not

substantially in dispute here, the only issue at bar would seem to be whether "performing diagnostics" includes any action "relating to investigation or analysis" of a problem, or only "detecti[on]" of problems. Neither party, however, has briefed this question. Thus the court must decide whether the meaning of the phrase "performing diagnostics" includes analysis or only detection.   The Merriam-Webster Online Dictionary defines "diagnostic" as "the art or practice of diagnosis," and defines "diagnosis" as "investigation or analysis of the cause or nature of a condition, situation, or problem." *See* http://m-w.com, last accessed May 19, 2005. (The court does not know whether Paradyne intended to quote Merriam-Webster.)   The court therefore adopts Paradyne's broader definition.

4.   *"a secondary communications link"*

Paradyne states that this phrase "refers to an alternative means of communication." VNO defines the phrase as meaning "an auxiliary communications link separate and distinct from the PVC such that the link does not use or share the same network resources as the PVC." Once again, the definitions hardly differ. VNO's definition, however, improperly adds a limitation not evident in the language of the claim.   As a technical matter, even if it were true that "if the secondary communications link were not separate and distinct from the PVC,

then the secondary communications link would also exhibit a failure and defeat the purpose of the '219 patent," paper no. 62, at 34-35, it does not follow that the secondary communications link may not use or share any of the same network resources, nor has VNO so demonstrated. On the contrary, it seems easily conceivable that a secondary link might use some, but not all, of the same network resources that are used by the PVC while still comprising a separate link for purposes of this claim. The court therefore adopts Paradyne's construction.

D.   The 352 Patent

The 352 patent is a system for automatically configuring a "time division multiplexed" ("TDM") connection for frame relay service.

A TDM connection is a connection that is shared by multiple virtual circuits by allotting "time slots" to the different circuits. In this time-sharing arrangement, each virtual circuit is reserved use of the connection for a certain portion of each unit of time. Time slots are extremely short; they are often measured in milliseconds. Because the slots are so short and so frequent, the connection appears to be shared constantly.

Frame relay services are among the types of services that utilize these time slots to send data from one point to another. If multiple services share a TDM connection, they will each be

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allotted a certain time slot or slots. Those slots might each be over- or under-utilized during any given interval. Because a frame relay service might be attempting send more or less data at any particular time, the 352 patent enables a network to predict whether time slots are going to go unused, and to reallocate them dynamically to other frame relay services that will utilize them. The 352 patent describes a system that predicts future usage by taking samples of the data that passes through the TDM connection. The system then reallocates the time slots by sending messages to the device that receives and transmits frame relay data across the TDM connection (the "frame relay device"); those messages tell the device which slot(s) to use.

1.   *(from preamble of claims 1 and 14): "automatic configuration of a frame relay network"*

The preamble of claim 1 states that the claim describes a "system for automatic configuration of a frame relay network . . . ." Paradyne does not seem to take seriously its own pronouncement that this preamble "does not breathe life into the patent claim" and "is not integral to the claim in view of the constituent elements of the claim," offering no reasoning to support either of those bald assertions. VNO argues that "automatic configuration" is the "fundamental characteristic of

the '352 patent that distinguishes the claim from prior art manual methods of configuring networks." Paper no. 62, at 37.

The court agrees, but not for VNO's reasons. The "non-disruptive" language in certain claims of the 674 patent is also, surely, a "fundamental characteristic" of the invention, but in that example, as explained *supra*, the phrase is purely descriptive of a goal to be achieved, and does not otherwise limit the claim. Here, however, "automatic configuration" is not merely descriptive of the purpose of the invention; it describes a necessary limitation on the claim not present in any of the non-preamble language of the claim, which recites a system that "determin[es] at least one dedicated time slot" for frame relay service and "establish[es] a local management interface" to "determin[e] whether" that time slot is available for frame relay service. Such a system, comprising the two recited elements but not otherwise limited by the preamble language, could provide data for manual network configuration or even for analysis not resulting in configuration at all. The phrase "automatic configuration" therefore "give[s] life" to the claim. *Bell Comm. Research,* 55 F.3d at 620.

Whether the phrase "frame relay network" actually imposes a limitation on the claim is effectively a moot issue: The claim recites logic to determine which time slot(s) to use for

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"frame relay service," so construing the preamble to require a frame relay network is, at worst, redundant.

The court therefore finds the preamble to impose a structural limitation on claim 1, namely, that the system must engage in automatic configuration of frame relay service.

2.   "*logic for determining at least one dedicated time slot for frame relay service among a plurality of time slots on a TDM connection line*"

The logic described is the first of two elements of the system recited in Claim 1.   Paradyne contends that this phrase means

> A mode of operation in a system resulting from the planning or synthesis of various elements programmed into the system used for deciding which of one or more definite "time slots," properly construed, among the class of all such time slots on a "TDM connection line," properly construed, is capable of using a fast packet switching technology that provides a virtual circuit service relaying variable-size frames but only employing physical layer and data link layer protocols.
>
> In time division multiplexing or switching, a "time slot" is the slot belonging to a voice, data, or video conversation.   It can be occupied with conversation or it can be left blank.   But the slot is always present.
>
> A "TDM connection line" is an electrical path facilitating communication using "time division multiplexing" technique, properly construed.   A "T1 connection" is an example of a TDM connection line.

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"Time division multiplexing (TDM)" is a technique for transmitting a number of separate data, voice and/or video signals simultaneously over one communications system by quickly interleaving a piece of each signal one after another.

Joint Statement at A-22-23. VNO counters that the phrase should be construed as a "means plus function" under § 112 ¶ 6:

[1] The **function** is "determining at least one dedicated time slot for frame relay service among a plurality of time slots on a TDM connection line."

"Determining at least one dedicated time slot for frame relay service" means detecting that a level of confidence variable for a time slot, that is increased and decreased based on sampling the time slot, breaches a high level of confidence threshold.

[2] The corresponding **structure** disclosed in the specification that performs the function is a microprocessor programmed to execute steps 153-189 shown in Fig. 2, or in hardware as a permanent semiconductor storing program instructions that follow those steps, or a combination of hardware and software with program instructions that follow those steps, and equivalents thereof.

Id. at 22 (emphasis and brackets in original).

Paradyne contends that the phrase is not a means plus function because there is sufficient structure in the described logic to accomplish the task of "determining at least one dedicated time slot for frame relay service . . . ." Paradyne also notes correctly that there exists a rebuttable presumption that claims not using the term 'means' do not fall under § 112 ¶ 6.

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The court, however, finds that the presumption is clearly
rebutted here. "The presumption that a limitation lacking the
term 'means' is not subject to [§ 112 ¶ 6] can be overcome if it
is demonstrated that the claim term fails to recite sufficiently
definite structure or else recites function without reciting
sufficient structure for performing that function." *Lighting
World,* 382 F.3d at 1358 (citing cases) (internal quotation marks
omitted). Here, there is no logic described in claim 1 at all;
the claim merely states that logic will be used for the function
of "determining at least one dedicated time slot . . . ."[8] In
this respect, the question is similar to the one presented in
Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206 (Fed.Cir.
1998). In that case, one patent claim in dispute recited the
requirement of

> a substantially non-resilient lever moving element for
> moving the lever from its disengaged position for

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[8] Logic to accomplish the task described in claim 1 is
elaborated upon, in part, in claims 2 through 5: Time slots are
"sampl[ed];" logic (not described in the claim) is used to
detect a data value corresponding to a "high-level data link
control flag;" more logic (also not described) is used to set a
"level of confidence" variable indicating the "probability that
said data value actually corresponds to a . . . control flag
[from] said frame relay device;" and the time slots are re-
sampled (the claim does not say how many times), and the
confidence variable increased or decreased according to whether
the data in the new sample matches the data in the previous
sample. The court has not been asked to construe claims 2
through 5.

engaging the protrusion of the lever with the cam
surface on the cam wheel so that the rotation of the
cam wheel thereafter in the given direction changes
the locking mechanism from the locked condition to the
unlocked condition . . . .

Id. at 1213. The patentee asserted that "lever moving element"
should not be construed as having been claimed in means-plus-
function format because it did not use "means for" language.
Id. The court found otherwise, stating that "even though the
catch phrase is not used, the limitation's language does not
provide any structure. The limitation is drafted as a function
to be performed rather than definite structure or materials."
The court continued:

> In the instant case, the claimed "lever moving
> element" is described in terms of its function not its
> mechanical structure. If we accepted La Gard's
> argument that we should not apply section 112, ¶ 6, a
> "moving element" could be any device that can cause
> the lever to move. La Gard's claim, however, cannot
> be construed so broadly to cover every conceivable way
> or means to perform the function of moving a lever,
> and there is no structure recited in the limitation
> that would save it from application of section 112, ¶
> 6.

Id. at 1213-14. So it is with this claim. "Logic for
determining at least one dedicated time slot(s)" describes only
a function, not a structure. Any number of different
algorithms, in the form of either computer code or hard-wired
circuit logic, could perform the recited function.

Paradyne's argument against applying § 112 ¶ 6 relies on

Affymetrix, Inc. v. Hyseq, Inc., 132 F.Supp.2d 1212 (N.D.Cal.

2001), in which one court held that "computer code that

[performs x function]" does not warrant application of § 112 ¶

6. *Id.* at 1231 (brackets in original). The court finds

Paradyne's analogy to *Affymetrix* inapposite. In *Affymetrix*, the

court explained that

> the Federal Circuit has found that sufficient
> structure is recited to escape application of § 112,
> ¶ 6 when the claim terms identify a type of structure
> that performs the stated function. *See Greenberg v.*
> *Ethicon Endo-Surgery, Inc.,* 91 F.3d 1580, 1583
> (Fed.Cir. 1996) (holding "detent mechanism" denotes a
> type of device with a generally understood meaning in
> the mechanical arts); *Personalized Media*
> *Communications, LLC v. International Trade Commission,*
> 161 F.3d 696, 704-05 (Fed.Cir. 1998) (holding "digital
> detector" connotes structure and is not a generic
> structural term such as "means," "element," or
> "device," nor is it a coined term lacking a clear
> meaning, such as "widget" or "ram-a-fram").
>
> The Court finds that "computer code" is not a
> generic term, but rather recites structure that is
> understood by those of skill in the art to be a type
> of device for accomplishing the stated functions. . .
> . "computer code" is a type of device for programming
> a computer.

Id. at 1232. Here, Paradyne has recited claims for logic, not

for computer code. Logic can be implemented in computer code,

in hardware, or in some combination of both, but logic, itself,

does not constitute a structure or device. *Accord ABB*

Automation Inc. v. Schlumberger Res. Mgmt. Svcs., Inc., 2003

U.S. Dist. LEXIS 5002 (D.Del. Mar. 27, 2003) ("The court finds that 'logic' does not recite sufficient structure to avoid means-plus-function analysis.").

As such, § 112 ¶ 6 applies. The function is "determining at least one dedicated time slot(s) for frame relay service among a plurality of time slots on a TDM connection line." The claim is limited to the corresponding structure disclosed in the specification, or its equivalents. That structure is a microprocessor programmed to execute steps 153-189 in the flowchart shown in Figure 2, or in hardware as a permanent semiconductor storing program instructions that follow those steps, or a combination of hardware and software with program instructions that follow those steps, and equivalents thereof. Those steps consist of: sampling the time slots of the signal on the TDM connection line; searching those samples for any sequence of data appearing to constitute an HDLC flag, which would indicate frame relay service; rechecking any time slot with such an apparent HDLC flag by either incrementing or decrementing a level of confidence ("LOC") variable depending on whether additional samples also contain the same HDLC flag sequence; and arriving at the determination that the time slot is, in fact, allocated to frame relay service only if the LOC variable exceeds a certain threshold value.

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3. **"*logic for establishing a local management interface with a frame relay device connected to said TDM connection line, the establishment of said local management interface determining whether said at least one dedicated time slot is available for frame relay service"***

The analysis of this element is the same as the previous element. The "logic for . . ." claim language recites only a function, and, suffering the same lack of structure, is subject to § 112 ¶ 6. The recited function is "establishing a local management interface (LMI) with a frame relay device connected to said TDM connection line, the establishment of said LMI determining whether said at least one dedicated time slot is available for frame relay service." The court looks to the specification for disclosure of the corresponding structure. That structure is a microprocessor programmed to execute steps 193-223 shown in Figure 2, or hardware, such as a permanent semiconductor storing program instructions that follow those steps, or a combination of hardware and software that follow those steps, and equivalents thereof. In those steps, a frame relay digital service unit ("DSU") at a user's site sends a standard LMI request, per the defacto standard commonly employed by those skilled in the art, over the potential dedicated time

slot (as determined by the logic described *supra*) to the frame relay switch at the central office. The DSU continues sending the standard LMI request for a certain period of time, called the "timeout period," and then determines whether that LMI is already established. If no LMI is established before the timeout period expires, the DSU stops sending standard LMI requests and begins again, this time using a second type of LMI request based on the "Annex A LMI" standard. If that also fails, a third type is tried, using the "Annex D LMI" standard. If none succeed, the timeout period is increased. If the new timeout period is greater than a predetermined maximum value, the entire process described by claim 14 begins again, beginning with step 153 of Figure 2; otherwise, the LMI establishment process begins again, starting with step 196 of Figure 2, but with the new, higher timeout value. If and when the frame relay switch responds to one of the LMI requests, the type of LMI is determined, confirming that the potential dedicated time slot(s) is in fact dedicated to frame relay service. That time slot(s) is identified and stored for future reference.

4.   *"determining at least one dedicated time slot for frame relay service among a plurality of time slots on a time division multiplexed (TDM) connection line"*

Claim 14 recites a "method for automatic configuration of a frame relay network, comprising" two steps, the first of which is the entire disputed phrase. Paradyne, essentially offering an ordinary and customary meaning, states that the phrase means "deciding that one or more definite 'time slots,' properly construed, among the class of all such time slots on a 'TDM connection line' . . . is for using [frame relay service]." VNO counters that it means "detecting that a level of confidence variable for a time slot, that is increased and decreased based on sampling the time slot for a frame relay flag, breaches a high level of confidence threshold."

The court begins with the "heavy presumption in favor of the ordinary meaning of claim language." *Johnson Worldwide*, 175 F.3d at 989. However, "[t]he prosecution history . . . limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance." *Standard Oil Co. v. American Cyanamid Co.,* 774 F.2d 448, 452 (Fed.Cir. 1985); *see Lemelson v. Gen. Mills, Inc.,* 968 F.2d 1202 (Fed.Cir. 1992) ("The

prosecution history gives insight into what the applicant originally claimed as the invention, and often what the applicant gave up in order to meet the Examiner's objections."). The court is "obligated to conduct" an inquiry into the prosecution history to establish the correct meaning of terms. *See Elkay Mfg. Co. v. Ebco Mfg. Co.,* 192 F.3d 973, 978 (Fed.Cir. 1999) (quoting *J.T. Eaton & Co. v. Atlantic Paste & Glue Co.,* 106 F.3d 1563, 1565 (Fed.Cir. 1997)). "Arguments made during the prosecution of a patent application are given the same weight as claim amendments." *Elkay,* 192 F.3d at 979 (Fed.Cir. 1999) (citing *Standard Oil,* 774 F.2d at 452)). A disavowal, however, "must be effected with 'reasonable clarity and deliberateness.'" *Springs Window Fashions,* 323 F.3d at 994 (quoting *N. Telecom Ltd. v. Samsung Elecs. Co.,* 215 F.3d 1281, 1294 (Fed.Cir. 2000)).

Whether a claim is limited by the prosecution history depends very much on the nature of that history. In *Samsung*, for instance, the Federal Circuit considered whether the prosecution history of a patent for a process for plasma etching disclaimed the existence of ion bombardment in the claimed process. The challenging party did not contend that the ordinary meaning of "plasma etching" excluded ion bombardment, but that "the intrinsic and extrinsic evidence of record compels

the conclusion that 'plasma etching' in claim 1 must be limited to circumstances where chemical processes are the only etching mechanism," thus excluding ion bombardment. *Id.* at 1292. The court, after examining the prosecution history, concluded that the history "does not explicitly call for ion bombardment; but neither does it specifically state its exclusion as part of the invention." *Id.* at 1294. Because the court found the history ambiguous on the central issue, the court erred on the side of the "heavy presumption in favor of the ordinary meaning of claim language." *Id.* at 1295 (quoting *Johnson Worldwide,* 175 F.3d at 989).

The Federal Circuit reached the opposite conclusion in *Elkay*. There, the court considered whether the words "a" and "an" should be construed to mean only "one" or "one or more" in reference to the number of tubes used in its "no-spill" adapters for bottled water coolers. *Id.* at 977. The court interpreted the ordinary meaning of those terms in the claim language to mean "one or more," and rejected an argument to the contrary grounded in the preferred embodiment, before turning to the prosecution history of the patent. A prior patent ("Krug") described a beer dispensing apparatus using separate liquid and air tubes; in distinguishing its invention, Elkay had used language that the court found to "necessarily relinquish[] a

construction of its claim language that could include separate feed tubes. Consequently, Elkay cannot successfully argue now that the feed tube limitation in [the disputed claims] is properly construed to include separate flow paths for liquid and air." *Id.* at 979.

Elkay argued that its distinction did not substantively amend the claim language, and that its emphasis was on another sense in which its invention was distinguishable from Krug. The court rejected that argument, stating that

> it is irrelevant whether Elkay relinquished this potential claim construction in an amendment to the claim or in an argument to overcome or distinguish a reference. It is similarly irrelevant whether Elkay emphasized this argument at the time, or indeed whether Elkay had to relinquish an interpretation of the feed tube limitation that could cover more than one flow path for liquid and air.
>
> Elkay's argument that its statement distinguishing Krug on the basis of Krug's use of separate feed tubes was insignificant is *particularly unpersuasive in view of the Examiner's response to that statement.* In the Examiner's Statement of Reasons for Allowance, . . . the Examiner wrote that he allowed [the disputed claim] because he understood the claim to describe a single feed tube with a single flow path for both liquid and air . . . .
>
> *Elkay did not respond to this statement.*

Id. (italics added). The court, basing its conclusion on "the claim language, the written description and the prosecution history," found that "during prosecution Elkay disavowed a

potential interpretation," and "gave up a construction of the .

. . limitation that could include an apparatus with" multiple

tubes. *Id.* at 979.

Here, VNO asserts that the 352 patent was allowed by the

Examiner only after the Examiner was persuaded that the

determination of a time slot for frame relay service is

"accomplished by analyzing HDLC [high-level data link control]

flag information in the time slots . . . ." See paper no. 62,

at 48; paper no. 51, App. A (hereinafter "352 prosecution

history"), at 496. Citing *Springs Window Fashions LP v. Novo*

Indus., L.P., 323 F.3d 989, 995 (Fed.Cir. 2003), VNO argues that

"Paradyne acquiesced to the examiner's reasons for allowance and

should not now be allowed to recapture claim scope that it

abandoned during prosecution." Paper no. 62, at 48. The court

agrees.

As an initial matter, the court notes that VNO's proposed

limitations, as stated, are inappropriate restrictions on the

definition of the phrase. As Paradyne notes in its brief,

"[t]here is no indication in this claim language that a 'high

level of confidence threshold' is required, to be breached or

otherwise," paper no. 51, at 37; and the Examiner makes no

reference to confidence thresholds in his reasons for allowance,

352 prosecution history at 495-96. Confidence thresholds are

discussed in the summary of the invention, *see* 352 patent at col. 3:29-30, and in the preferred embodiment, *see id.* at col 6:42-50; but as noted *supra*, language in the preferred embodiment cannot, alone, rebut the presumption of ordinary meaning.

The question of HDLC flags, however, is more difficult. There is no mention of HDLC flag analysis anywhere in the language of claim 14, but it was obviously of critical import to the Examiner. The record reveals that the Examiner initially rejected Paradyne's application. *See* 352 prosecution history at 394-400. Paradyne responded with amendments, and the Examiner again rejected the application, this time with finality. *See id.* at 424-444 (substitute first response), 446-50 (second and final rejection). After a second filing of responsive amendments, *see id.* at 454-469 (which, because it was deemed insufficiently responsive and raised new issues, was not entered into the record by the Examiner, *see id.* at 471), the parties participated in what appears to have been a mutually enlightening teleconference. Soon thereafter Paradyne resubmitted substantially the same arguments, *see id*. at 476-493 (preliminary amendment, incorporating the unentered second response) whereupon the Examiner issued a Notice of Allowability, *see id*. at 494-497. The contents of that Notice

of Allowability lead this court to agree with VNO that HDLC flag

analysis is a requirement of the patent. First, the Examiner

amended the title of the patent from "Automatic Configuration

System and Method for a Frame Relay Network" to "Automatic

Configuration System *Which Analyzes HDLC Flag Data* in TDM Time

Slots for Determining Which Time Slot(s) Is Dedicated for Frame

Relay Service."   *Id*. at 495 (italics added).   Second, the

Examiner stated:

> The following is an Examiner's statement of reasons
> for allowance: Claims are considered allowable since
> when reading the claims in light of the specification,
> as per *In re Donaldson Co., Inc.,* 29 USPQ 2d 1845,
> 1850 (Fed.Cir. 1994), none of the references of record
> alone or in combination disclose or suggest the
> combination of limitations specified in the
> independent claims including logic for determining at
> least one dedicated time slot for frame relay service.
> The applicant argued that this is accomplished by
> analyzing HDLC flag information in the time slots, see
> page 5 and 13.
>
> The Examiner was persuaded by the arguments filed
> 10/22/01, especially pages 5 and 13.

Id. at 495-96. Together, this statement and the amended title

make clear that the Examiner relied upon Paradyne's references

to HDLC analysis. *See id.* at 480 ("The invention analyzes

[HDLC] flag information in the time slots to determine whether

the time slot has the potential to carry frame relay

information."), 488 ("The invention monitors the TDM channel and

determines, by analyzing the [HDLC] flags in each time slot,

whether that time slot is indeed dedicated for frame relay use.").

On this critical issue of the clarity of the Examiner's reasons for allowance, the instant case is akin to *Elkay*, not *Samsung*. Moreover, as in *Elkay*, when presented with the amended title and statement of reasons for allowance, Paradyne challenged neither. (The court also notes that Paradyne raises no objection to the HDLC limitation in its claim construction brief.) The court therefore finds that Paradyne has ceded any construction of claim 14 not including the limitation that the determination of dedicated time slot(s) be made using HDLC flag analysis, and adopts the following definition of the disputed phrase: "deciding, by analysis of high-level data link control flags, that one or more definite time slots, among the class of all such time slots on a TDM connection line, is for frame relay service."

> 5. ***"the establishment of said local management interface ['LMI'] determining whether said at least one dedicated time slot is available for frame relay service"***

The parties do not disagree as to the meaning of "frame relay service." Paradyne states that the disputed phrase means "[t]he arrangement of the LMI deciding whether one or more 'time

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slot,' properly construed, is ready for use of [frame relay

service]." VNO counters that it means

> using logic that determines whether any available time
> slots are potentially available for frame relay use,
> and then using the establishment of [an LMI] to
> determine whether the suspected time slots is [sic]
> indeed available for frame relay use. The logic uses
> a series of LMI protocols, each tested in sequence,
> not for sensing LMI protocols, but for using the
> establishment of the LMI protocol to determine whether
> the detected time slots are dedicated for frame relay
> use.

Joint Statement at A-25.

As the first sentence of this construction is substantially

the same as Paradyne's, the parties' dispute centers on the

second sentence, which introduces limitations not evident from

the claim language. Paradyne protests that these limitations

are "not even claimed in the plain language of claim 14," and

that "[t]here is no indication in this claim language of

separate 'logic,' or that a 'series of LMI protocols' (as

described by Visual in the Joint Statement, p. A-25) is required

to be used . . . ." Paper no. 51, at 38. VNO, however, defends

these limitations by asserting that "Paradyne again ignores the

limiting statements it made in prosecution to convince the

examiner to issue the patent. Paradyne's statements in the

prosecution history are a clear disavowal of merely sensing the

type of LMI that is used in the frame relay system." VNO offers

no citations to support its assertion, so it is left to the

court to discern the relevant passage(s).   They appear to be

these:

> *Natarajan et al.* appears to describe a system for
> autosensing [an LMI] protocol in a frame relay
> network. . . .
>
> *Natarajan et al.* appears to teach away from the
> present invention by requiring the generation of "a
> set of protocol requests for a plurality of protocols,
> and by thereafter simultaneously listening for
> protocol responses from the frame relay network
> equipment or switch." See column 1, lines 40-43. The
> present invention uses a series of LMI protocols, each
> tested in sequence, not for sensing LMI protocols, but
> for using the establishment of the LMI protocol to
> determine whether the detected time slots are
> dedicated for frame relay use.

352 prosecution history at 486, 489.   The disavowal could hardly

be clearer.   As explained *supra*, such a disavowal is tantamount

to claim amendment, despite the language of the claim.   The

court therefore construes the claim to be limited as described

by VNO.

VI. Conclusion

For all these reasons, the court construes the disputed

terms and phrases as explained herein.   A separate Order will

follow.

<div align="right">

_____/s/_____
DEBORAH K. CHASANOW
United States District Judge

June 15, 2005

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